

WATERFOWL BREEDING POPULATION SURVEY

SOUTHERN AND CENTRAL ALBERTA

MAY 2002



The map shows the outline of Southern and Central Alberta. Survey routes are indicated by numbered circles (76, 75, 26, 27, 28, 29) and specific locations are marked with dots. The locations are as follows:

- Route 76:** FORT ST. JOHN, PEACE RIVER, GRANDE PRAIRIE
- Route 75:** SLAVE LAKE, LAC LABICHE, COLD LAKE
- Route 26:** EDMONTON, VERMILION, RED DEER
- Route 27:** HANNA
- Route 28:** CALGARY, BROOKS
- Route 29:** MEDICINE HAT, LETHBRIDGE

Logos on the left side of the map include:

- U.S. FISH & WILDLIFE SERVICE
- CANADIAN WILDLIFE SERVICE
- Alberta ENVIRONMENTAL PROTECTION Natural Resources

TITLE Waterfowl Breeding Population and Habitat Survey for Southern and Central Alberta

STRATA SURVEYED 26, 27, 28, 29, 75, 76

DATES May 14-30, 2002

DATA SUPPLIED BY United States Fish and Wildlife Service (USFWS)
Canadian Wildlife Service (CWS)
Alberta Environmental Protection/Wildlife
Management Division (AEP)
Ducks Unlimited, Canada (DUC)

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ABSTRACT

The 2002 breeding population estimate for strata 26-29 (Southern Alberta) is 2,374,500 total ducks (Table 1), a decrease of -6.2% from 2001, a decrease of -29.5% from the recent ten-year mean (1992-2001) and a decrease of -46.5% from the long-term mean (1955-2001). In Southern Alberta, total dabbling ducks (Table 1) decreased -6.6% from 2001, -27.7% from the 1992-2001 ten-year mean and remained -47.6% below the 1955-2001 long-term mean. Mallards (Table 1) increased +6.7% from 2001, Blue-winged Teal decreased -33.6% from 2001 and Pintails increased +10.5% from 2001. Total diving ducks (Table 1) decreased -4.5% from 2001, decreased -37.3% from the

1992-2001 ten-year mean and decreased -41.1% from the 1955-2001 long-term mean. Total pond counts (Table 2) increased +12% in Southern Alberta from last year, decreased -30.5% from the ten-year and -34.5% from the long term means.

The 2002 breeding population estimate for strata 75-76 (Central Alberta) is 1,815,800 total ducks (Table 4) an increase of +22.7% from last year and an increase of +24.6% from the long-term(13 year) mean. Total dabbling ducks increased +42 % from last year and increased +39.2% from the 13-year mean. Mallards increased +8.6% from 2001, and increased +28.4% from the 13-year mean.

Blue-winged Teal increased +169.1% from last year and increased +50.4% from the 13-year mean.

Pintails increased +161.3% from 2001 and decreased -18.3% from the 13-year mean. Total diving ducks decreased -6.2% from last year and decreased -1.8% from the 13-year mean. Total ponds (Table 5) in Stratum 75 and 76 increased +41% from last year and increased +20.5% from the 13-year mean.

We are seeing a continuation of a decade of drought on the Alberta Prairies and Aspen parklands. The fall, winter and spring in Southern and Central Alberta saw below normal precipitation in the majority of the province. Winter temperatures were well below normal. The mountain snow pack was much below normal in Southern and Central Alberta. Spring was very late this year with below normal temperatures and delayed thawing of wetlands. Grass growth on the prairies is poor with no residual upland nesting cover for Pintails.

METHODS

The procedures followed in conducting the survey are contained in the Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys, Section III, revised April 1987. The analytical and procedural changes, described in the 1991 and 1992 reports, continued this year. As a result, measures of precision are now available with the population estimates. This years and the last seven years reports reflects a major change made to the historical (1955-1995) database of breeding waterfowl and habitat estimates. Nonparametric regression methods were used to predict population values for years in which no survey was conducted in a stratum. An internal report (Office of Migratory Bird Management, Laurel, MD) describes how and for which cases prediction was done.

Air-ground segment data in Central Alberta's strata 75 and 76(12- air/ground segments = 13% of the survey area) are not sufficient to compute accurate visibility correction factors (VCF's) for all duck species. Stratum 26 more closely resembles the habitat of 75 and 76 than the other Southern Alberta strata (27-29). It was decided to combine air-ground data from strata 26, 75 and 76, when calculating VCF's for strata 75 and 76. Acceptable standard errors and variances were obtained when this was done. Southern Alberta VCF's are still calculated with data from strata 26-29 only (37- air/ground segments = 25% of the survey area).

In 1996, Canada goose breeding population estimates were corrected for visibility bias based on data collected by air and ground survey crews in this reporting region. For validity of comparisons to means for previous years, historical Canada goose population indices were also adjusted for visibility bias using data collected by all air and ground survey crews throughout the Canadian and U.S. prairie regions in 1996. Therefore, estimates and means reported here cannot be directly compared with those in reports written before 1996 for this region.

Air data were compiled using a notebook computer. All areas in the current survey design (Tables 3 and 6) were flown. The survey was conducted using the same aerial crew and aircraft, a Cessna 206,

for strata 26-29, and 75. This was the 15th year of flying aerial waterfowl surveys for the aerial crew. All air and ground crew members participated in pre-survey training. The Alberta ground crew did reconnaissance of the survey area and concluded that most species observed appeared paired by May 14. Most deciduous tree species were not leafed out and the season timing appeared much later than normal in southern areas. The survey was initiated on May 14 for Southern Alberta and completed on May 24. The Central Alberta survey commenced on May 24 and concluded on May 30. A total of 65 flight hours was required to complete the survey. Aerial Pintail telemetry and shorebird telemetry was conducted in conjunction with the waterfowl survey when logistics allowed. Data was forwarded to USGS, Dixon, CA.

WEATHER AND HABITAT CONDITIONS

Environment Canada, Climate Research Branch reports below average temperatures for the November 2001 to April 2002 period. April 2002 was the 3rd coldest in 120 years of record and the coldest in the last 48 years of record. Spring in Southern and Central Alberta saw well below normal (40-60% of average) precipitation in the eastern portions of the province and below normal (60-80% of average) precipitation in the western portions of the province. Temperatures were below average and precipitation in May was generally below-average in most areas of the province.

The Milk River country along the Montana border was in fair condition. Most of the Prairie Grassland portions of strata 27, 28 and 29 were in poor condition. Dug out levels (some of the only remaining water) were in the dry, to 1/4 full level in the southern portions of the Prairie grasslands. Late spring snow storms occurred weekly around Calgary and continued into June dumping as much as 3 feet of snow at a time, thus decreasing duck nesting habitat in those areas.

The eastern portions of the Aspen Parklands of Stratum 26 were mostly in poor condition with areas of fair condition in a 50 mile radius around Edmonton and Red Deer. Dugout levels were in the 1/2 full level.

The Ag Forest Transition and Parklands of stratum 75 and 76 were generally in fair condition. The more permanent type wetlands available in these areas were in fair condition compared to 2001. Scars from the 1998 fires are still visible (250,000+ hectares of tundra and forest burned in the Slave Lake and Swan Hills portions of Stratum 75) plus new fires in this area were adding to the destruction of the parklands.

BREEDING POPULATION INDICES

A listing of all birds and the respective comparisons can be found in Tables 1 and 4, the Trend Graphs and Appendices 1 and 2.

SOUTHERN ALBERTA

The 2002 breeding population estimate for strata 26-29 (Southern Alberta) is 2,374,500 total ducks (Table 1), a decrease of -6.2% from 2001, a decrease of -29.5% from the recent ten-year mean (1992-2001) and a decrease of -46.5% from the long-term mean (1955-2001). In Southern Alberta, total dabbling ducks (Table 1) decreased -6.6% from 2001, -27.7% from the 1992-2001 ten-year mean and remained -47.6% below the 1955-2001 long-term mean. Mallards (Table 1) increased

+6.7% from 2001, decreased -5.0% from the 10-year mean and decreased -30.1% from the long term means. Blue-winged Teal decreased -33.6% from 2001, decreased -49.8% from the 10-year mean, and decreased -61% from the long-term means. Pintails increased +10.5% from 2001, decreased -69.6% from the 10-year mean and decreased -90.5% from the long-term mean. Total diving ducks (Table 1) decreased -4.5 % from 2001, decreased -37.3% from the 1992-2001 ten-year mean and decreased -41.1% from the 1955-2001 long-term mean. Total pond counts (Table 2) increased +12% in Southern Alberta from last year, decreased -30.5% from the ten-year and -34.5% from the long term means. Canada geese numbers changed -7.8%, +25.5% and +207.9%, and Coots changed +81.3%, +29.8 and +64.7 % from the above respective means.

CENTRAL ALBERTA

The 2002 breeding population estimate for strata 75-76 (Central Alberta) is 1,815,800 total ducks (Table 4). In Central Alberta, total ducks (Table 4) increased +22.7% from last year and increased +24.6% from the long-term (13 year) mean. Total dabbling ducks increased +42.0% from last year and increased +39.2% from the 13-year mean. Mallards increased +8.6% from 2001, and increased +28.4% from the 13-year mean. Blue-winged Teal increased +169.1% from last year and increased +50.4 from the 13-year mean. Pintails increased +161.3% from 2001 and decreased -18.3% from the 13-year mean. Total diving ducks decreased -6.2 % from last year and decreased -1.8% from the 13-year mean. Total ponds (Table 5) in Stratum 75 and 76 increased +41.0% from last year and increased +20.5% from the 13-year mean.

CONCLUSIONS

- 1) Poor habitat conditions and drought seem to be the continued trend again in Alberta this year. Ducks appeared crowded in the few remaining wetlands. This intense competition for nesting territories will likely have a negative effect on nesting success.
- 2) The extremely late spring likely killed early nesting attempts and may have discouraged re-nesting and encouraged an overflight of migrating waterfowl. Green-winged teal, Blue-winged teal, Shoveler, total ducks and Canada Goose numbers were down compared to last year in Southern Alberta while their numbers were up in Central Alberta suggesting an overflight of the dry Prairies to the better habitat of the Peace Parklands this year. While Pintail numbers were up 10% compared to last year, counts this year remain one of the lowest on record since 1955.
- 3) Diving duck numbers were down in southern and Central Alberta compared to last year and long term means. With pond levels being so low for a decade now, these over water nesters are having a hard time finding suitable nesting habitat.

Sincere appreciation is extended to all who participated in this survey. Thank you to the Winnipeg Climate Center and Alberta Agriculture for precipitation data and soil moisture maps.

Submitted by: Elizabeth Buelna-Flyway Biologist

Date: June 26, 2002

Table 1. Status of waterfowl breeding population estimates (thousands, adjusted for visibility bias) by species and stratum with comparison against the previous year, the previous 10-year mean, and the long-term mean for Southern Alberta.

Species/Ponds	Stratum				% Change From						
	26	27	28	29	2002 Total	2001 Total	10-Year Mean	Long- Term Mean	2001	10-Year Mean	Long- Term Mean
Ducks											
Dabblers											
Mallard	544.7	83.2	70.7	94.7	793.3	743.8	835.1	1134.9	6.7%	-5.0%	-30.1%
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	-100.0%
Gadwall	249.1	49.6	20.0	14.7	333.4	256.8	366.7	309.4	29.8%	-9.1%	7.8%
Am. wigeon	45.9	13.4	7.4	10.8	77.5	186.8	186.5	312.1	-58.5%	-58.5%	-75.2%
Am. green-winged teal	110.9	31.2	4.9	0.0	147.0	190.5	216.9	198.9	-22.8%	-32.2%	-26.1%
Blue-winged teal	171.1	45.5	16.3	11.2	244.2	367.8	486.3	626.8	-33.6%	-49.8%	-61.0%
N. shoveler	171.3	41.0	33.4	28.3	274.0	267.8	355.4	355.5	2.3%	-22.9%	-22.9%
N. pintail	24.8	10.3	15.8	22.0	73.0	66.1	240.1	766.4	10.5%	-69.6%	-90.5%
Subtotal	1317.8	274.2	168.6	181.7	1942.3	2079.5	2687.1	3703.9	-6.6%	-27.7%	-47.6%
Divers											
Redhead	106.8	1.1	4.3	0.3	112.5	54.0	112.8	118.2	108.6%	-0.3%	-4.8%
Canvasback	9.3	1.7	2.4	1.2	14.5	31.9	56.8	65.3	-54.6%	-74.5%	-77.8%
Scaups	116.8	21.5	5.2	3.0	146.5	201.9	287.8	371.2	-27.5%	-49.1%	-60.5%
Ring-necked duck	4.0	1.0	1.6	1.0	7.5	20.2	19.4	17.2	-62.7%	-61.3%	-56.3%
Goldeneyes	6.6	0.0	0.0	0.0	6.6	22.6	17.9	14.3	-70.9%	-63.2%	-54.0%
Bufflehead	41.9	4.2	0.4	0.7	47.2	59.2	72.7	47.5	-20.2%	-35.0%	-0.6%
Ruddy Duck	71.5	1.9	10.4	2.6	86.5	51.6	104.8	81.5	67.6%	-17.5%	6.1%
Subtotal	356.8	31.4	24.3	8.8	421.3	441.3	672.3	715.2	-4.5%	-37.3%	-41.1%
Miscellaneous											
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	-100.0%
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--	--
Scoters	0.5	0.0	0.0	0.0	0.5	1.8	2.5	13.7	-71.4%	-79.0%	-96.2%
Mergansers	10.5	0.0	0.0	0.0	10.5	8.5	7.5	6.8	23.5%	39.1%	54.6%
Subtotal	11.0	0.0	0.0	0.0	11.0	10.3	10.0	20.5	6.6%	9.7%	-46.3%
Total Ducks	1685.7	305.6	192.8	190.5	2374.5	2531.1	3369.3	4439.6	-6.2%	-29.5%	-46.5%
Canada Goose	122.5	18.9	36.8	18.8	196.9	213.5	156.9	64.0	-7.8%	25.5%	207.9%
Am. coot	300.3	22.4	20.2	33.2	376.1	207.4	289.7	228.3	81.3%	29.8%	64.7%
Ponds	249.4	80.1	59.9	87.5	476.9	425.7	686.1	728.4	12.0%	-30.5%	-34.5%

Table 2. Long term-trend in adjusted May pond estimates (thousands) by stratum with comparisons against the previous year, the previous 10-year mean, and the long-term mean for Southern Alberta.

Year	Stratum				Total
	26	27	28	29	
1961	358.2	105.8	82.0	49.8	595.7
1962	395.5	84.9	73.2	52.5	606.2
1963	543.0	127.9	49.1	57.6	777.6
1964	366.7	97.1	62.1	118.6	644.5
1965	601.7	197.5	95.5	104.2	998.8
1966	490.2	162.6	134.9	76.2	863.9
1967	377.5	155.9	215.8	169.9	919.1
1968	266.1	43.6	47.3	80.9	438.0
1969	483.2	156.4	125.3	94.5	859.5
1970	531.2	187.1	86.5	77.8	882.7
1971	585.4	196.6	121.4	78.0	981.4
1972	517.1	92.7	60.1	61.2	731.1
1973	683.9	136.4	121.3	83.6	1025.2
1974	947.3	259.1	124.1	64.1	1394.6
1975	428.2	205.8	178.3	145.6	957.9
1976	459.6	144.2	104.1	123.7	831.6
1977	433.8	53.0	45.4	55.8	588.0
1978	295.8	89.8	88.6	145.6	619.9
1979	617.2	124.9	100.7	153.7	996.4
1980	281.2	68.1	59.1	52.1	460.6
1981	365.2	80.5	58.9	64.7	569.3
1982	374.6	86.4	66.8	103.3	631.1
1983	318.7	56.0	58.0	64.3	497.1
1984	386.4	69.8	42.9	38.8	537.9
1985	493.5	170.2	89.3	75.3	828.3
1986	514.5	70.7	46.4	96.0	727.5
1987	325.0	151.5	58.1	72.1	606.8
1988	229.3	61.6	52.7	74.3	417.9
1989	274.0	111.2	57.8	105.9	548.9
1990	467.9	116.4	66.2	121.7	772.1
1991	445.7	83.1	73.5	93.4	695.7
1992	328.1	78.3	48.0	48.8	503.2
1993	344.0	139.1	90.7	115.9	689.8
1994	406.1	122.5	69.8	122.0	720.4
1995	417.9	93.2	58.8	118.8	688.7
1996	522.1	138.4	130.5	112.9	903.9
1997	653.6	199.0	143.2	104.6	1100.4
1998	358.1	78.7	66.3	56.2	559.3
1999	469.5	104.6	67.2	74.7	716.0
2000	345.9	89.3	63.1	54.8	553.1
2001	226.4	67.6	56.6	75.1	425.7
2002	249.4	80.1	59.9	87.5	476.9
10-year Mean	407.2	111.1	79.4	88.4	686.1
Long-term Mean	437.3	118.5	83.9	88.8	728.4
Percent Change:					
From 2001	10.1%	18.6%	5.8%	16.5%	12.0%
From 10-year Mean	-38.8%	-27.9%	-24.6%	-1.0%	-30.5%
From Long-term Mean	-43.0%	-32.4%	-28.6%	-1.4%	-34.5%

Table 3. Survey design for Southern Alberta, May 2002.

	STRATUM				
	26	27	28	29	Total
<u>Survey design</u>					
Square miles in stratum	26,448	11,724	12,890	13,235	64,297
Square miles in sample-waterfowl	544.5	288.0	310.5	171.0	1,314
Square miles in sample-ponds	272.3	144.0	155.25	85.5	657
Lineal miles in sample	2,178	1,152	1,242	684	5,256
Number of transects in sample	11	6	7	4	28
Number of segments in sample	121	64	69	38	292
Expansion factor	48.5730	40.7083	41.5137	77.3977	---
<u>Current year coverage</u>					
Square miles in sample-waterfowl	256.5	144.0	130.5	171.0	697.5
Square miles in sample-ponds	126.0	72.0	65.25	85.5	348.75
Lineal miles in sample	1,008	576	522	684	2,790
Number of transects in sample	6	3	3	4	16
Number of segments in sample	57	32	29	38	155
Expansion factor	103.11	81.4167	98.7739	77.3977	—

Appendix 1. Long-term trend in adjusted waterfowl breeding population estimates (thousands) for Southern Alberta.

Species/Ponds	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
Ducks										
Dabblers										
Mallard	1907.0	1757.6	1986.7	2072.2	1753.0	1502.4	1330.9	983.1	1227.9	1119.4
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	200.3	269.9	187.1	219.6	275.7	369.2	279.6	207.8	198.8	256.6
Am. wigeon	582.3	535.6	535.8	548.9	616.0	539.9	502.3	380.1	315.2	346.3
Am. green-winged teal	351.3	182.2	186.2	205.1	324.4	262.3	320.6	63.4	72.8	114.6
Blue-winged teal	1550.2	903.8	908.6	1078.5	903.6	877.8	897.1	346.7	426.8	634.6
N. shoveler	397.2	405.0	349.8	442.3	321.1	431.9	303.5	196.8	378.0	342.0
N. pintail	1591.5	1521.5	1250.6	1223.9	832.6	1087.5	513.3	328.6	811.9	417.6
Subtotal	6579.8	5575.5	5404.8	5790.4	5026.5	5071.0	4147.3	2506.6	3431.5	3231.1
Divers										
Redhead	140.5	145.7	105.9	127.2	113.2	71.3	78.1	44.3	79.6	88.6
Canvasback	96.2	98.7	100.6	168.7	78.1	58.3	63.9	54.6	77.6	83.8
Scaups	427.2	483.2	515.1	490.6	400.2	325.8	393.6	231.9	358.5	400.5
Ring-necked duck	1.4	8.8	1.5	4.5	9.4	2.9	10.1	2.1	1.7	3.4
Goldeneyes	16.0	21.1	15.5	9.1	8.7	11.4	11.2	7.9	2.4	5.9
Bufflehead	26.1	36.6	33.8	39.5	44.6	32.9	53.2	22.1	26.5	24.4
Ruddy Duck	76.2	78.3	43.4	51.6	79.2	97.9	49.8	21.9	37.4	93.0
Subtotal	783.7	872.4	815.8	891.1	733.5	600.4	660.0	384.9	583.8	699.5
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	0.0	28.0	21.6	20.6	26.9	18.9	25.6	25.2	16.4	17.1
Mergansers	0.0	0.0	0.0	5.9	4.0	1.2	0.4	0.0	0.0	1.6
Subtotal	0.0	28.0	21.6	26.5	30.9	20.1	26.0	25.2	16.4	18.7
Total Ducks	7363.6	6475.9	6242.1	6708.1	5790.9	5691.5	4833.3	2916.7	4031.7	3949.3
Canada Goose	0.0	0.7	17.2	35.4	31.2	50.6	37.9	24.7	34.1	38.0
Am. coot	141.3	108.0	56.6	98.1	169.8	120.1	92.9	19.7	82.2	40.0
Ponds							595.7	606.2	777.6	644.5

Species/Ponds	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Ducks										
Dabblers										
Mallard	893.9	1546.7	1502.4	912.0	1121.4	1594.6	1871.3	1825.3	1729.5	1576.2
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	200.3	479.6	415.8	491.6	339.0	343.3	362.8	444.9	281.0	495.6
Am. wigeon	320.9	385.5	485.3	467.5	403.8	434.3	502.0	448.4	394.1	514.5
Am. green-winged teal	117.2	176.1	175.0	121.5	204.5	203.6	263.3	288.1	311.9	404.8
Blue-winged teal	494.1	533.2	712.9	325.3	363.2	440.9	714.3	494.9	459.2	1209.7
N. shoveler	276.2	470.8	538.5	394.6	433.3	329.1	423.6	435.7	466.1	588.0
N. pintail	777.1	1265.2	1559.5	501.6	1584.5	1366.4	1763.1	1716.4	1025.1	2123.1
Subtotal	3079.8	4857.2	5389.4	3214.1	4449.8	4712.1	5900.4	5653.8	4666.9	6911.9
Divers										
Redhead	93.3	190.1	194.4	85.0	117.8	74.7	68.7	118.1	89.1	155.3
Canvasback	100.5	68.5	97.9	57.9	26.7	49.4	39.0	65.5	54.0	100.2
Scaups	306.5	238.7	346.8	234.0	350.9	367.9	299.5	426.8	588.9	368.6
Ring-necked duck	11.0	4.3	34.8	11.0	8.7	14.2	36.2	30.6	2.0	15.1
Goldeneyes	1.5	4.9	0.0	5.6	8.9	3.6	20.4	15.6	19.7	17.7
Bufflehead	71.1	33.4	48.6	32.4	44.1	40.4	33.8	53.3	30.6	26.0
Ruddy Duck	93.4	83.0	111.9	96.7	47.9	66.9	56.7	102.0	38.2	93.3
Subtotal	677.3	623.0	834.4	522.7	605.0	617.1	554.4	811.9	822.5	776.3
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	16.9	20.0	23.6	17.5	21.6	23.2	12.1	13.2	16.0	8.0
Mergansers	9.3	7.7	1.8	1.1	1.7	9.4	4.1	4.2	2.1	0.0
Subtotal	26.1	27.7	25.4	18.6	23.3	32.7	16.1	17.4	18.1	8.0
Total Ducks	3783.3	5507.9	6249.2	3755.4	5078.0	5361.9	6470.9	6483.0	5507.5	7696.2
Canada Goose	24.0	19.0	34.6	15.0	23.5	28.4	50.0	30.5	35.7	29.2
Am. coot	65.1	48.1	202.5	98.8	144.8	169.8	99.7	122.6	145.4	267.0
Ponds	998.8	863.9	919.1	438.0	859.5	882.7	981.4	731.1	1025.2	1394.6

Appendix 1 (continued). Long-term trend in adjusted waterfowl breeding population estimates (thousands) for Southern Alberta.

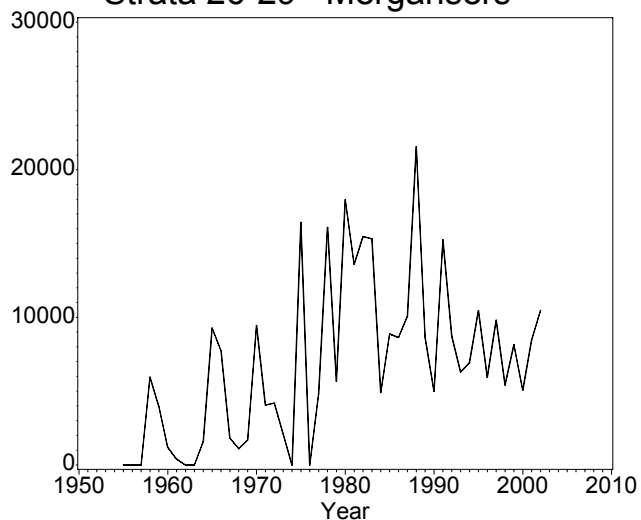
Species/Ponds	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Ducks										
Dabblers										
Mallard	1398.3	1453.6	853.3	823.5	983.1	975.2	947.1	765.8	845.6	713.0
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Gadwall	303.7	308.7	392.2	279.7	346.4	319.6	309.4	215.5	142.3	204.4
Am. wigeon	384.3	344.5	194.9	303.5	402.5	403.9	179.8	200.0	170.9	158.4
Am. green-winged teal	230.8	345.6	151.9	222.3	256.8	224.0	180.1	127.5	136.2	117.7
Blue-winged teal	1108.2	820.3	751.0	393.2	592.9	834.6	1148.1	498.1	419.1	429.2
N. shoveler	550.3	325.0	220.8	259.0	391.4	388.8	503.9	320.4	200.3	187.3
N. pintail	1553.1	956.5	345.8	1087.6	1456.4	842.3	657.3	576.8	380.8	299.8
Subtotal	5528.7	4554.3	2909.8	3368.7	4429.5	3988.3	3926.1	2704.1	2295.1	2109.9
Divers										
Redhead	181.7	173.4	202.1	133.8	100.7	268.4	111.1	57.8	60.4	98.3
Canvasback	78.9	52.1	64.6	51.2	53.5	62.1	49.4	73.8	49.7	26.6
Scaups	382.7	625.9	477.7	463.0	687.5	473.0	469.3	522.1	491.9	367.5
Ring-necked duck	26.0	13.5	23.9	50.9	21.3	8.9	29.5	23.7	12.7	33.6
Goldeneyes	15.5	28.3	3.9	33.2	7.6	29.6	4.6	6.8	6.8	1.7
Bufflehead	56.1	47.3	35.2	60.6	67.2	32.3	55.5	42.2	57.4	25.8
Ruddy Duck	184.7	33.6	101.5	75.5	42.0	33.9	63.0	116.0	72.9	62.3
Subtotal	925.7	974.1	908.9	868.3	979.7	908.2	782.5	842.4	751.8	615.8
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	7.3	24.1	13.5	26.0	36.2	20.4	7.7	11.8	6.4	17.3
Mergansers	16.4	0.0	4.8	16.1	5.7	18.0	13.6	15.5	15.3	4.9
Subtotal	23.8	24.1	18.3	42.1	41.9	38.3	21.3	27.9	21.7	22.2
Total Ducks	6478.2	5552.5	3837.0	4279.1	5451.1	4934.9	4729.8	3574.4	3068.6	2748.0
Canada Goose	30.2	19.8	23.8	30.2	35.5	21.1	45.6	40.3	41.7	46.8
Am. coot	483.3	83.5	285.4	168.4	418.0	501.1	405.0	371.7	253.2	542.7
Ponds	957.9	831.6	588.0	619.9	996.4	460.6	569.3	631.1	497.1	537.9

Species/Ponds	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Ducks										
Dabblers										
Mallard	803.0	698.8	753.9	627.4	585.9	778.7	769.2	733.5	753.8	848.8
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	164.9	226.4	127.1	256.4	250.2	414.4	292.7	358.0	414.3	511.7
Am. wigeon	177.3	90.2	110.4	85.5	95.9	123.2	117.9	170.3	198.5	193.2
Am. green-winged teal	106.7	78.7	120.3	162.0	106.0	132.5	131.1	174.4	175.9	152.6
Blue-winged teal	295.3	361.9	596.6	552.9	418.2	521.2	580.2	716.1	526.6	466.6
N. shoveler	321.2	220.7	330.7	165.6	227.9	322.5	294.5	241.4	421.1	421.4
N. pintail	593.4	242.6	447.4	171.4	313.6	317.7	116.3	103.9	372.5	383.4
Subtotal	2461.7	1919.3	2486.4	2021.3	1997.7	2610.3	2301.9	2497.7	2862.8	2977.7
Divers										
Redhead	133.9	123.3	143.5	85.7	96.6	162.8	110.8	112.0	110.3	110.3
Canvasback	56.6	59.2	53.5	54.8	36.7	78.1	58.4	32.8	45.9	64.0
Scaups	363.2	322.7	256.2	345.2	158.0	307.3	299.8	288.0	268.4	265.0
Ring-necked duck	18.7	11.7	18.6	35.3	46.5	12.4	14.9	15.4	9.6	12.6
Goldeneyes	16.2	29.9	24.2	31.6	16.1	19.3	10.6	10.1	9.5	15.1
Bufflehead	17.0	33.8	22.7	50.8	32.5	36.5	80.0	67.6	79.6	43.1
Ruddy Duck	43.8	32.9	35.8	77.9	65.6	129.9	193.8	85.2	57.1	65.5
Subtotal	649.4	613.5	554.4	681.3	451.9	746.4	768.3	611.1	580.3	575.5
Miscellaneous										
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	18.6	17.2	1.1	7.2	5.6	9.9	15.5	4.4	0.8	5.2
Mergansers	8.9	8.6	10.1	21.6	8.6	5.0	15.2	8.7	6.3	6.9
Subtotal	27.5	25.8	11.1	28.8	14.2	14.9	31.1	13.1	7.1	12.1
Total Ducks	3138.6	2558.7	3052.0	2731.3	2463.9	3371.6	3101.3	3121.9	3450.1	3565.3
Canada Goose	49.6	79.6	59.0	95.5	79.3	113.8	66.8	100.1	85.1	129.0
Am. coot	327.3	282.2	137.9	166.1	349.5	485.7	279.7	307.4	282.1	234.7
Ponds	828.3	727.5	606.8	417.9	548.9	772.1	695.7	503.2	689.8	720.4

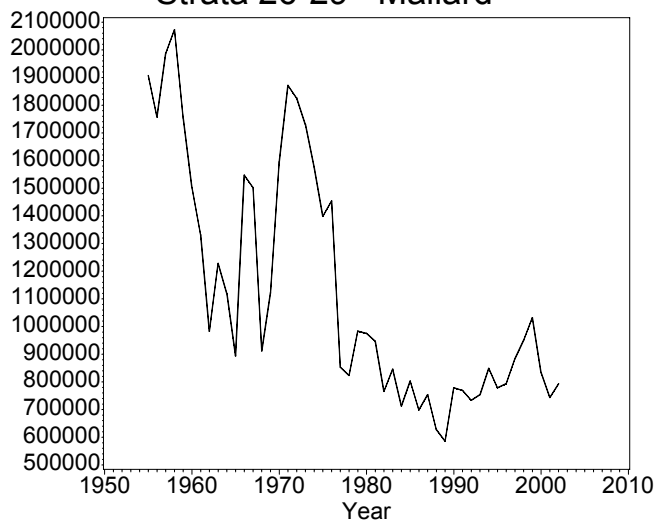
Appendix 1 (continued). Long-term trend in adjusted waterfowl breeding population estimates (thousands) for Southern Alberta.

Species/Ponds	1995	1996	1997	1998	1999	2000	2001	2002
Ducks								
Dabblers								
Mallard	778.5	793.8	883.6	950.1	1031.8	833.2	743.8	793.3
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	410.6	404.2	308.3	360.2	332.5	310.9	256.8	333.4
Am. wigeon	179.8	191.1	190.5	150.3	179.6	225.2	186.8	77.5
Am. green-winged teal	245.3	314.5	324.4	92.2	190.5	308.1	190.5	147
Blue-winged teal	430.8	505.9	358.5	521.9	391.5	577.8	367.8	244.2
N. shoveler	267.6	373.8	443.2	329.4	408.2	380.4	267.8	274
N. pintail	198.2	333.5	472.8	166.3	115.0	188.8	66.1	73
Subtotal	2510.7	2916.8	2981.3	2570.5	2649.2	2824.4	2079.5	1942.3
Divers								
Redhead	95.2	102.7	188.9	67.6	180.7	106.8	54.0	112.5
Canvasback	60.5	67.0	68.5	68.6	56.1	73.2	31.9	14.5
Scaups	366.5	376.4	347.7	243.1	228.2	292.3	201.9	146.5
Ring-necked duck	9.0	10.1	37.4	11.9	52.0	16.2	20.2	7.5
Goldeneyes	31.4	6.1	6.9	44.7	5.8	26.5	22.6	6.6
Bufflehead	68.3	103.5	91.3	73.9	69.5	70.9	59.2	47.2
Ruddy Duck	128.5	302.2	87.1	123.6	73.4	74.3	51.6	86.5
Subtotal	759.4	967.8	827.9	633.3	665.8	660.3	441.3	421.3
Miscellaneous								
Long-tailed duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	10.9	0.3	1.3	0.0	0.3	0.0	1.8	0.5
Mergansers	10.4	5.9	9.8	5.4	8.1	5.1	8.5	10.5
Subtotal	21.3	6.2	11.1	5.4	8.4	5.1	10.3	11
Total Ducks	3291.4	3890.9	3820.2	3209.2	3323.4	3489.7	2531.1	2374.5
Canada Goose	158.0	160.2	109.8	191.6	151.8	269.5	213.5	196.9
Am. coot	232.9	234.4	377.5	260.0	342.3	418.8	207.4	376.1
Ponds	688.7	903.9	1100.4	559.3	716.0	553.1	425.7	476.9

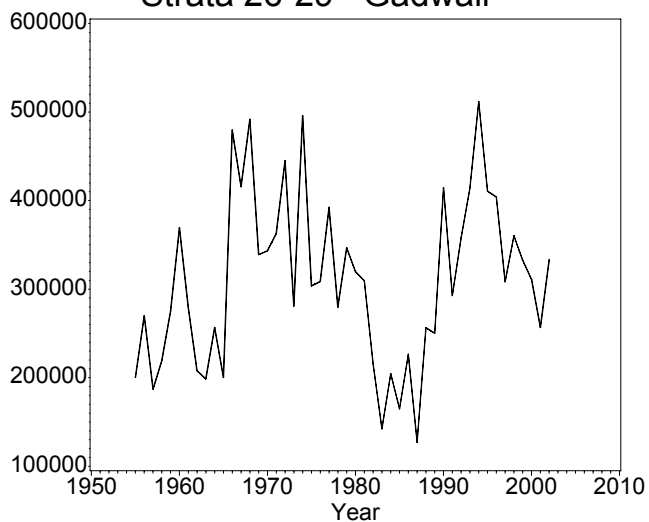
Strata 26-29 Mergansers



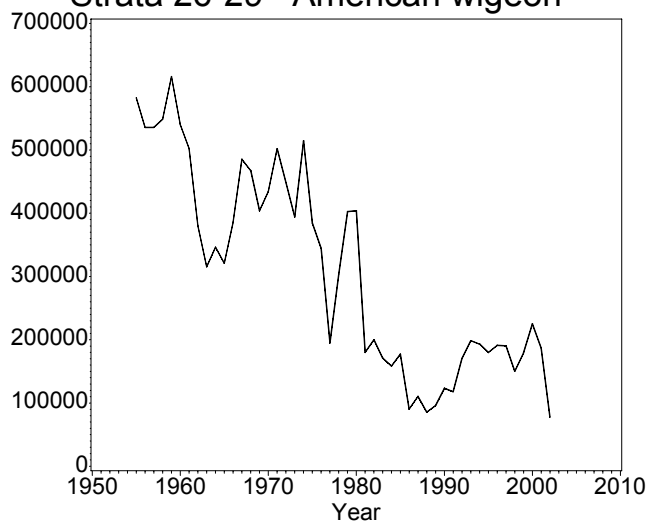
Strata 26-29 Mallard



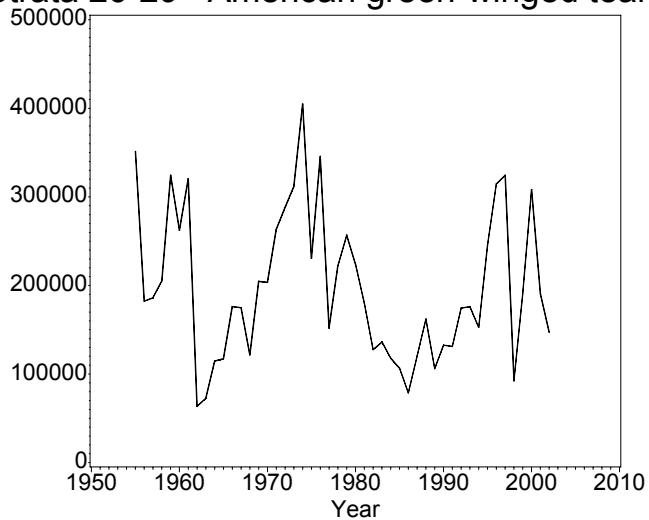
Strata 26-29 Gadwall



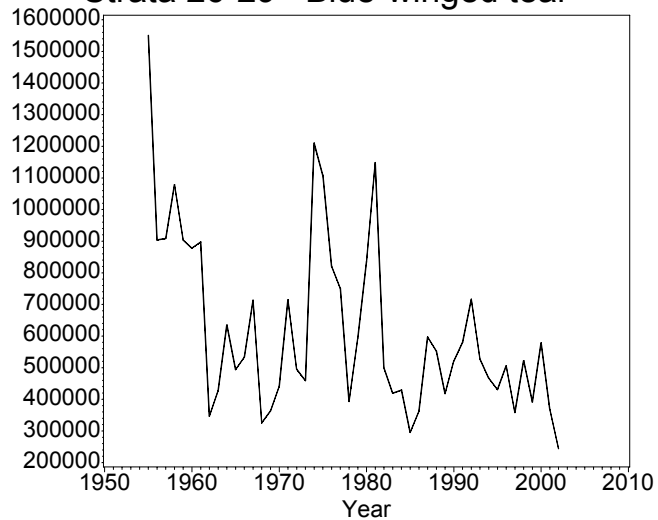
Strata 26-29 American wigeon



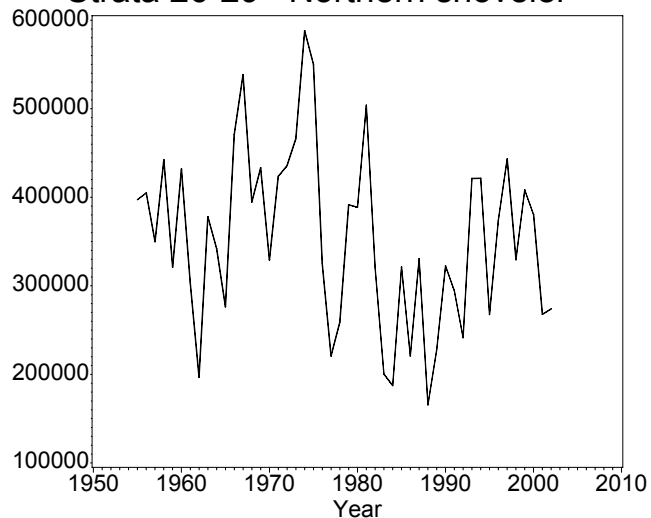
Strata 26-29 American green-winged teal



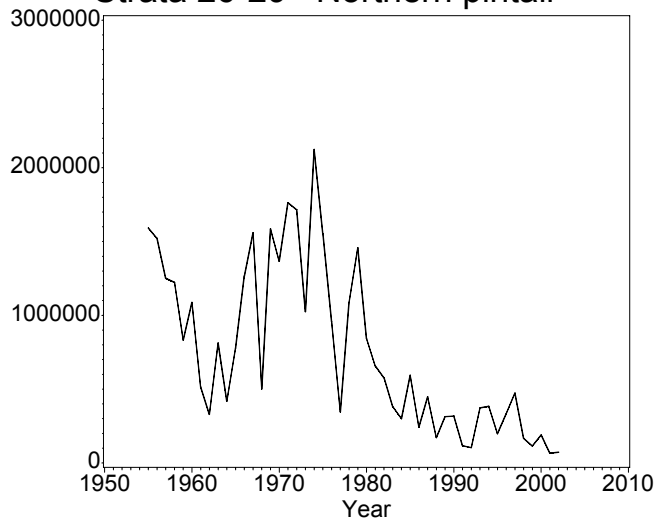
Strata 26-29 Blue-winged teal



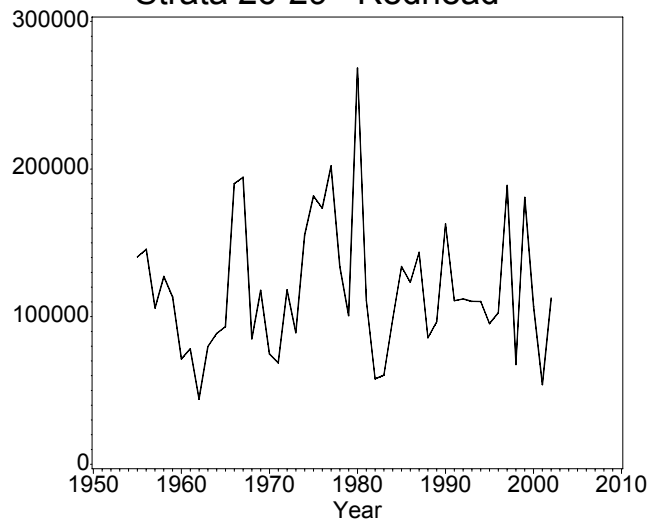
Strata 26-29 Northern shoveler



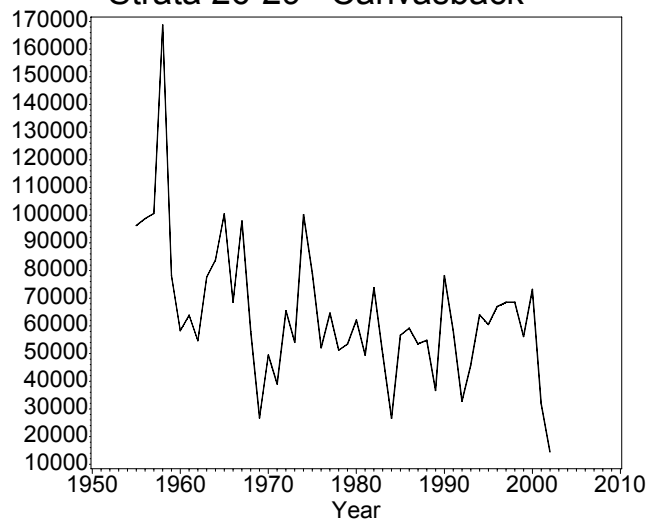
Strata 26-29 Northern pintail



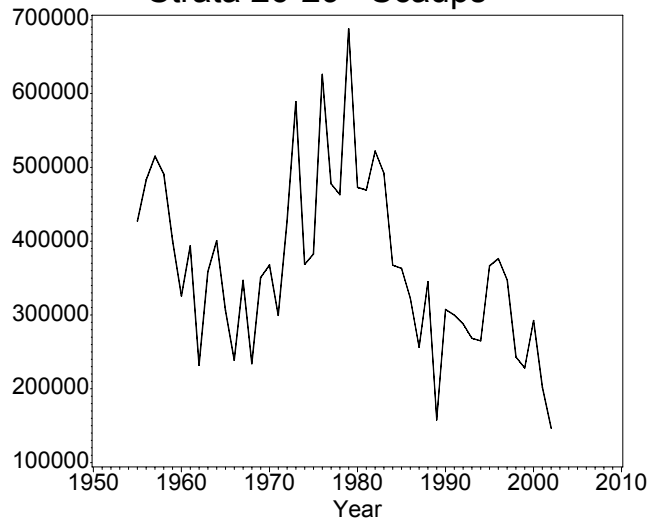
Strata 26-29 Redhead



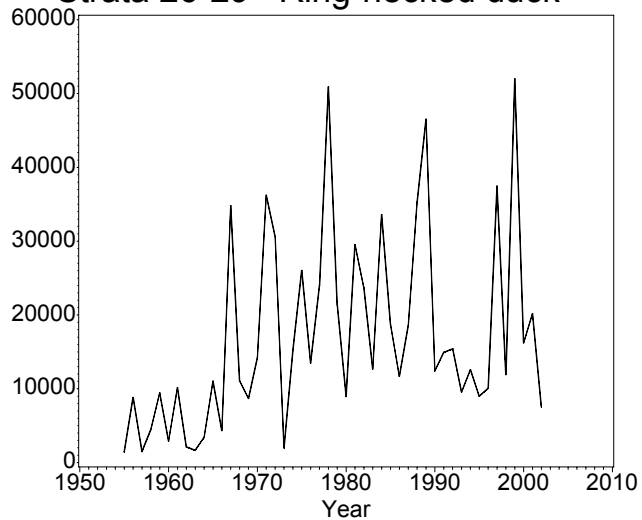
Strata 26-29 Canvasback



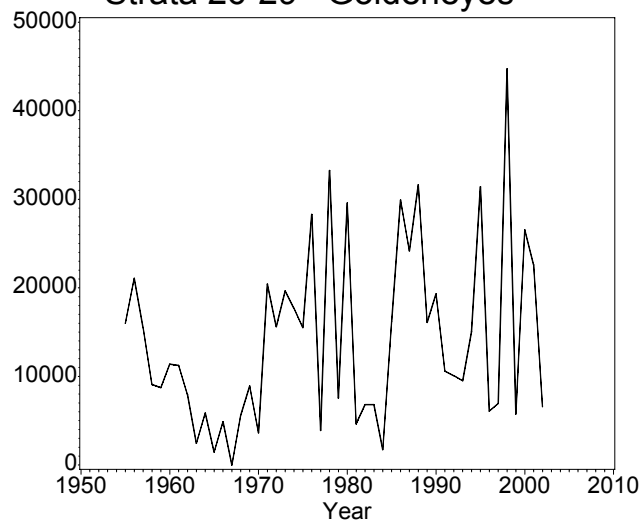
Strata 26-29 Scaups



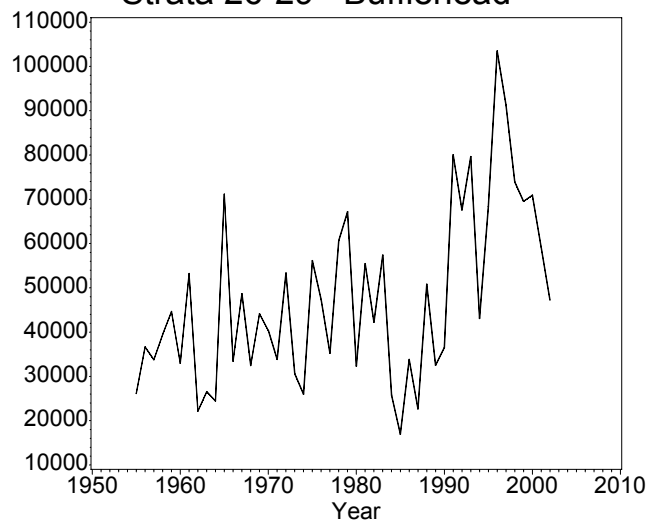
Strata 26-29 Ring-necked duck



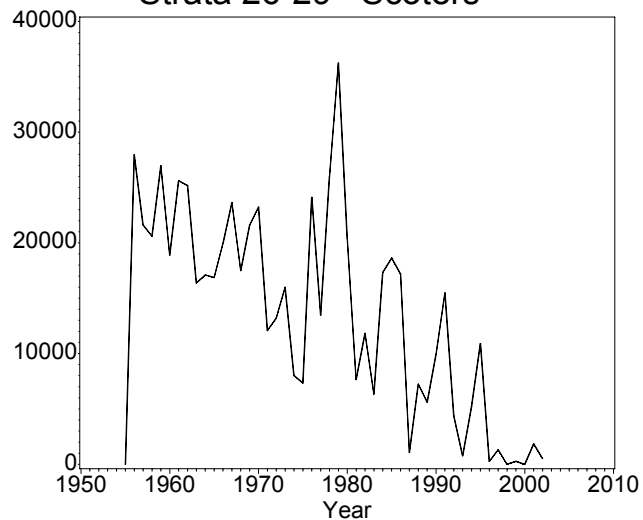
Strata 26-29 Goldeneyes



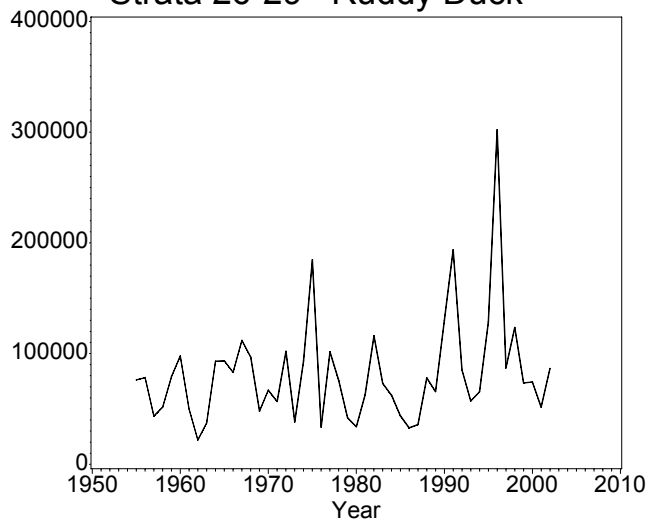
Strata 26-29 Bufflehead



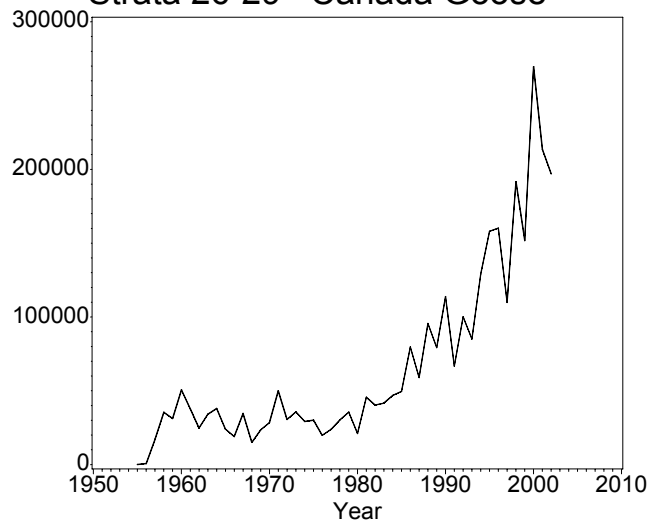
Strata 26-29 Scoters



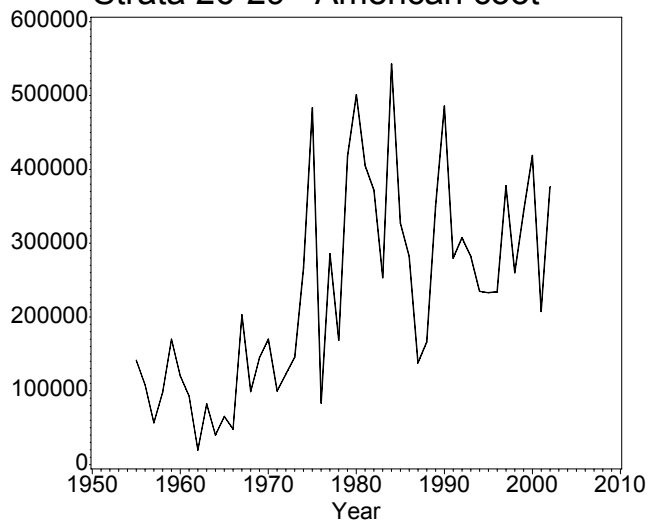
Strata 26-29 Ruddy Duck



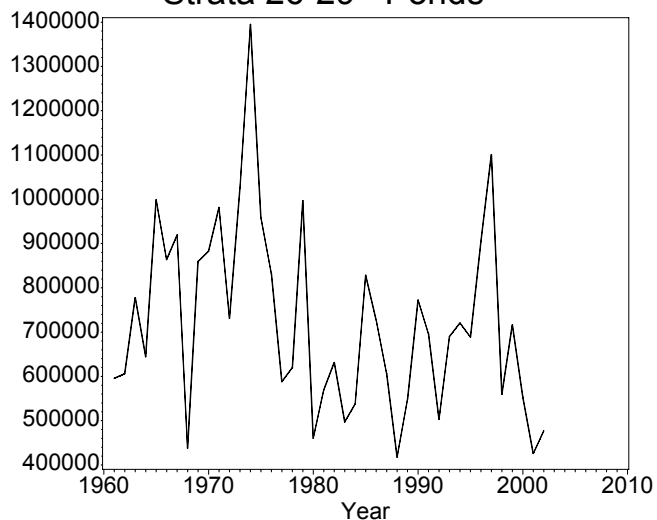
Strata 26-29 Canada Goose



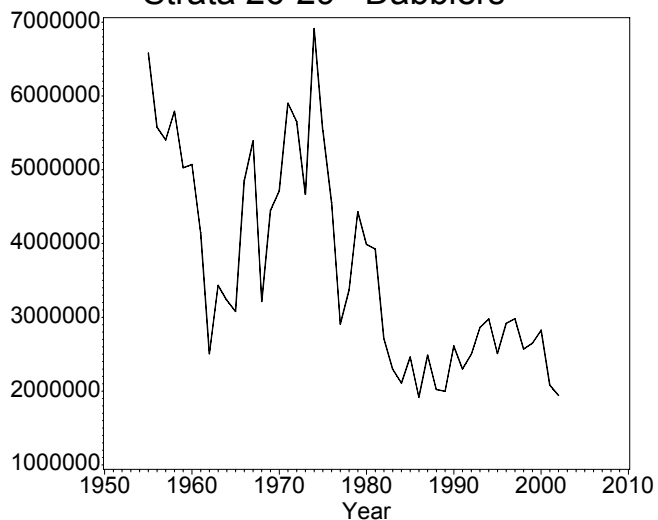
Strata 26-29 American coot



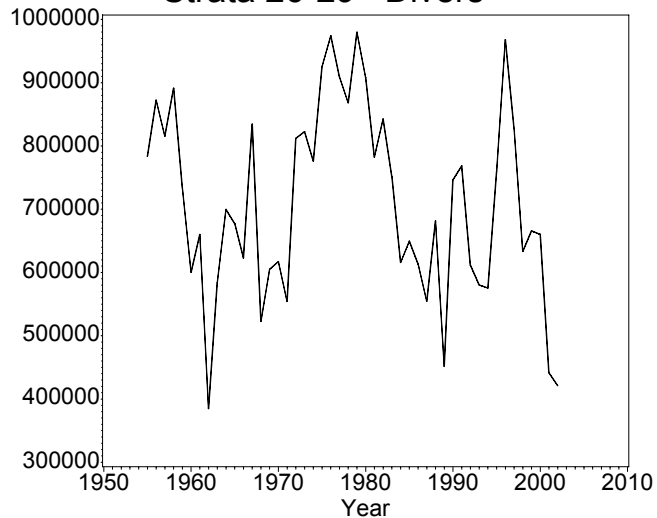
Strata 26-29 Ponds



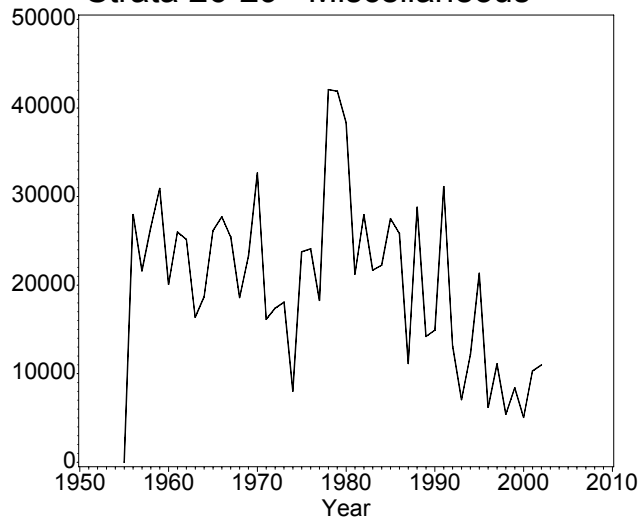
Strata 26-29 Dabblers



Strata 26-29 Divers



Strata 26-29 Miscellaneous



Strata 26-29 Total Ducks

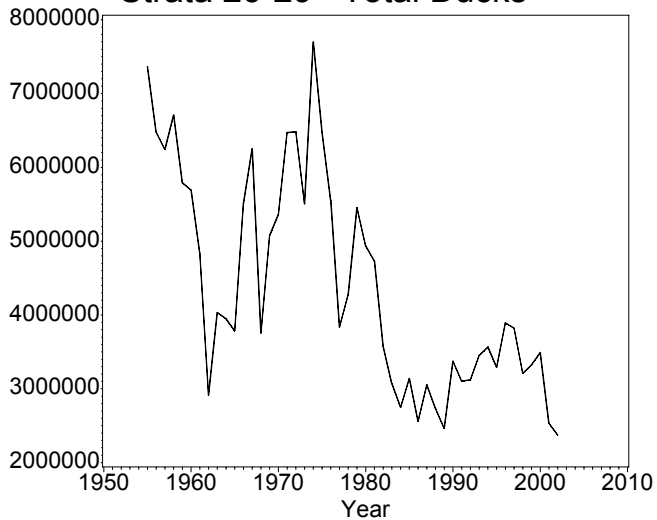


Table 4. Status of waterfowl breeding population estimates (thousands, adjusted for visibility bias) by species and stratum with comparison against the previous year and the previous long-term mean for Central Alberta.

Species/Ponds	Stratum		2002 Total	2001 Total	Long-Term Mean	% Change From	
	75	76				2001	Long-Term Mean
Ducks							
Dabblers							
Mallard	205.8	340.7	546.5	503.3	425.6	8.6%	28.4%
Am. black duck	0.0	0.0	0.0	0.0	0.0	--	--
Gadwall	57.7	73.5	131.2	86.6	57.0	51.5%	130.0%
Am. wigeon	16.0	29.4	45.4	61.5	88.2	-26.2%	-48.6%
Am. green-winged teal	53.9	130.2	184.1	70.7	114.4	160.6%	60.9%
Blue-winged teal	57.6	147.3	204.8	76.1	136.2	169.1%	50.4%
N. shoveler	43.6	114.0	157.6	101.0	83.1	56.0%	89.7%
N. pintail	3.8	11.6	15.5	5.9	18.9	161.3%	-18.3%
Subtotal	438.3	846.8	1285.1	905.1	923.5	42.0%	39.2%
Divers							
Redhead	12.0	9.9	21.9	20.1	32.7	9.0%	-33.1%
Canvasback	11.9	14.2	26.1	24.9	34.4	4.9%	-24.1%
Scaups	70.9	73.2	144.2	208.7	155.0	-30.9%	-7.0%
Ring-necked duck	2.7	3.9	6.7	32.0	38.7	-79.1%	-82.7%
Goldeneyes	26.0	5.2	31.3	58.7	42.3	-46.7%	-26.2%
Bufflehead	91.9	101.5	193.4	163.9	161.4	18.0%	19.9%
Ruddy Duck	45.6	36.7	82.3	31.0	50.5	165.4%	63.0%
Subtotal	261.2	244.6	505.8	539.2	515.0	-6.2%	-1.8%
Miscellaneous							
Long-tailed Duck	0.0	0.0	0.0	0.0	0.0	--	--
Eiders	0.0	0.0	0.0	0.0	0.0	--	--
Scoters	1.0	1.8	2.8	16.2	8.7	-82.8%	-67.9%
Mergansers	14.4	7.7	22.1	18.9	9.6	17.1%	129.3%
Subtotal	15.4	9.5	24.9	35.1	18.3	-29.0%	35.7%
Total Ducks	714.9	1100.9	1815.8	1479.4	1456.8	22.7%	24.6%
Canada Goose	41.6	43.4	85.0	76.7	44.9	10.8%	89.5%
Am. coot	243.1	143.8	386.8	48.9	138.5	691.6%	179.2%
Ponds	184.8	387.8	572.5	406.0	475.1	41.0%	20.5%

Table 5. Long-term trend in adjusted May pond estimates (thousands) by stratum with comparisons against the previous year and the previous long-term mean for Central Alberta.

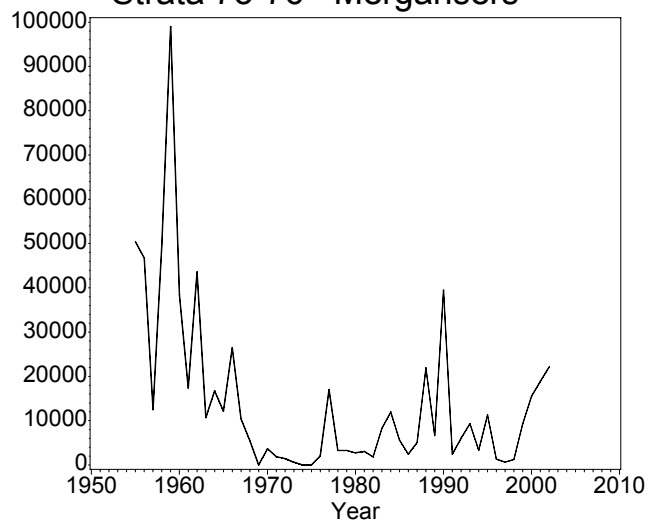
Year	Stratum		Total
	75	76	
1989	160.4	251.5	411.9
1990	174.4	315.5	489.9
1991	166.1	252.1	418.2
1992	137.2	282.0	419.2
1993	156.2	245.3	401.5
1994	147.2	238.2	385.4
1995	175.1	330.9	505.9
1996	239.3	329.6	569.0
1997	394.1	405.4	799.5
1998	170.5	225.5	395.9
1999	209.0	337.2	546.2
2000	129.0	298.2	427.2
2001	139.6	266.4	406.0
2002	184.8	387.8	572.5
1989-2001 Mean	184.5	290.6	475.1
Percent Change:			
From 2001	32.4%	45.5%	41.0%
From 1989-2001 Mean	0.2%	33.4%	20.5%

Appendix 2. Long-term trend in adjusted waterfowl breeding population estimates (thousands) for Central Alberta.

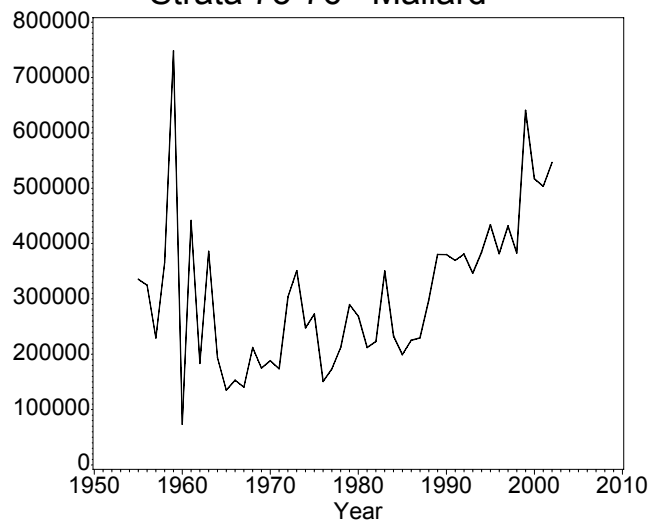
Species/Ponds	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Ducks										
Dabblers										
Mallard	380.2	380.0	369.4	380.9	346.4	384.4	434.0	381.6	431.9	382.8
Am. black duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gadwall	59.3	62.6	32.1	41.3	31.7	41.1	29.4	64.6	68.3	99.2
Am. wigeon	62.0	84.2	101.6	82.4	97.7	97.2	139.0	115.6	110.8	57.6
Am. green-winged teal	50.6	41.1	57.5	62.7	82.4	121.9	144.0	146.1	167.9	41.4
Blue-winged teal	161.3	160.2	127.2	158.2	55.6	95.1	76.1	163.6	117.0	183.4
N. shoveler	87.4	101.4	60.7	100.6	46.8	65.0	62.6	76.1	113.5	87.4
N. pintail	35.2	23.5	7.2	8.4	2.9	12.5	13.8	18.1	74.4	13.3
Subtotal	835.9	852.9	755.8	834.5	663.4	817.3	899.0	965.8	1083.8	865.0
Divers										
Redhead	21.7	26.3	15.0	72.8	31.7	23.1	9.6	18.4	35.7	50.2
Canvasback	28.9	37.6	5.6	13.7	59.0	42.8	10.6	90.4	26.7	61.3
Scaups	128.0	194.9	124.6	153.4	136.9	131.9	126.3	182.5	159.2	81.1
Ring-necked duck	24.7	20.2	18.0	15.5	25.1	88.2	86.2	44.2	26.1	32.2
Goldeneyes	28.5	50.6	39.4	25.2	39.4	55.7	71.0	16.4	73.5	47.0
Bufflehead	87.0	135.2	156.1	220.3	116.7	90.8	136.8	232.2	231.8	202.5
Ruddy Duck	64.7	44.2	5.7	62.8	60.7	4.9	27.5	57.6	7.5	194.8
Subtotal	383.6	509.1	364.4	563.8	469.6	437.4	468.1	641.7	560.6	669.1
Miscellaneous										
Long-tailed Duck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scoters	9.0	11.4	12.6	10.7	3.4	10.1	11.8	0.5	11.5	4.3
Mergansers	6.6	39.5	2.4	6.0	9.3	3.3	11.3	1.3	0.6	1.3
Subtotal	15.6	50.8	15.0	16.8	12.7	13.4	23.1	1.9	12.1	5.5
Total Ducks	1235.1	1412.8	1135.1	1415.1	1145.7	1268.1	1390.2	1609.4	1656.5	1539.7
Canada Goose	12.5	19.0	15.4	19.8	18.9	20.7	43.3	48.2	29.1	71.1
Am. coot	26.4	158.7	21.6	64.0	62.6	39.7	31.9	37.7	243.3	375.3
Ponds	411.9	489.9	418.2	419.2	401.5	385.4	505.9	569.0	799.5	395.9

Species/Ponds	1999	2000	2001	2002
Ducks				
Dabblers				
Mallard	640.5	516.8	503.3	546.5
Am. black duck	0.0	0.0	0.0	0
Gadwall	68.6	56.9	86.6	131.2
Am. wigeon	93.0	44.3	61.5	45.4
Am. green-winged teal	174.0	327.3	70.7	184.1
Blue-winged teal	150.1	246.8	76.1	204.8
N. shoveler	78.4	99.1	101.0	157.6
N. pintail	19.8	10.8	5.9	15.5
Subtotal	1224.5	1301.9	905.1	1285.1
Divers				
Redhead	82.9	18.0	20.1	21.9
Canvasback	34.5	10.6	24.9	26.1
Scaups	207.0	181.0	208.7	144.2
Ring-necked duck	61.8	28.5	32.0	6.7
Goldeneyes	9.9	35.1	58.7	31.3
Bufflehead	190.3	133.9	163.9	193.4
Ruddy Duck	27.3	67.8	31.0	82.3
Subtotal	613.7	474.9	539.2	505.8
Miscellaneous				
Long-tailed Duck	0.0	0.0	0.0	0
Eiders	0.0	0.0	0.0	0
Scoters	2.9	8.8	16.2	2.8
Mergansers	9.3	15.5	18.9	22.1
Subtotal	12.2	24.3	35.1	24.9
Total Ducks	1850.4	1801.1	1479.4	1815.8
Canada Goose	93.8	114.5	76.7	85
Am. coot	142.4	548.6	48.9	386.8
Ponds	546.2	427.2	406.0	572.5

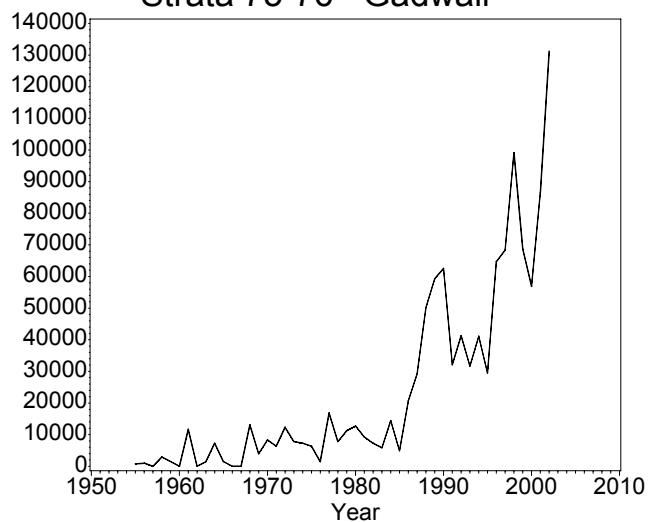
Strata 75-76 Mergansers



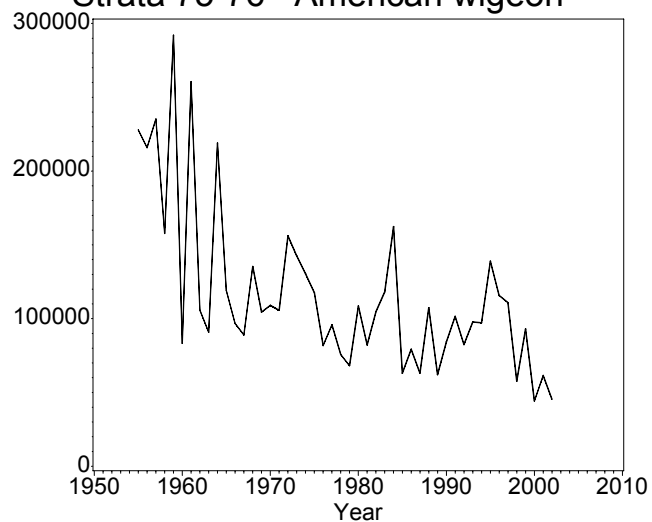
Strata 75-76 Mallard



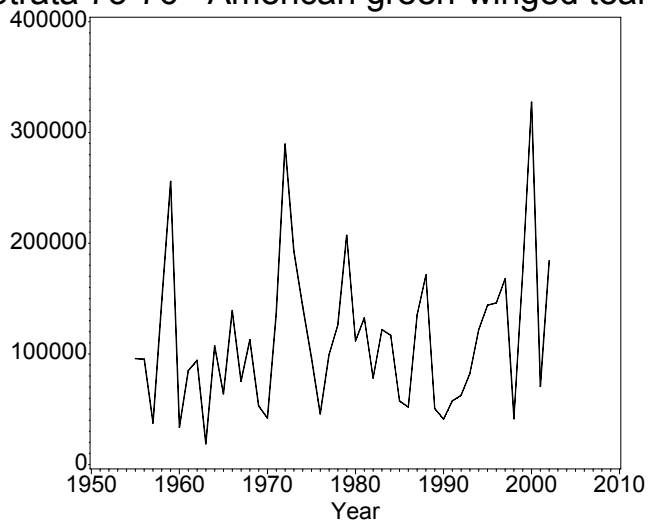
Strata 75-76 Gadwall



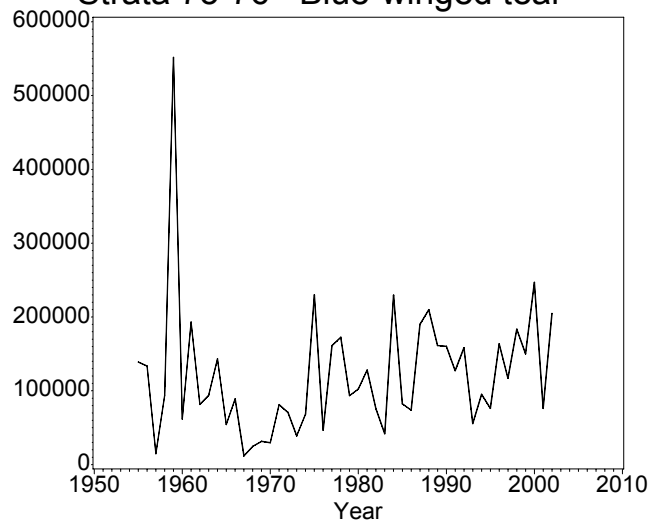
Strata 75-76 American wigeon



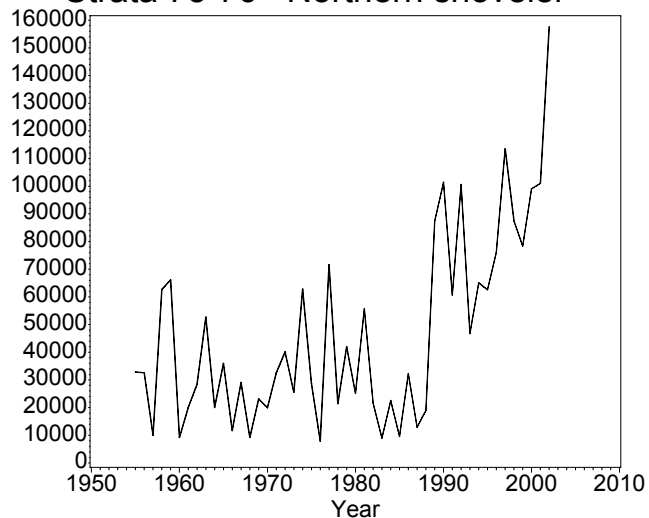
Strata 75-76 American green-winged teal



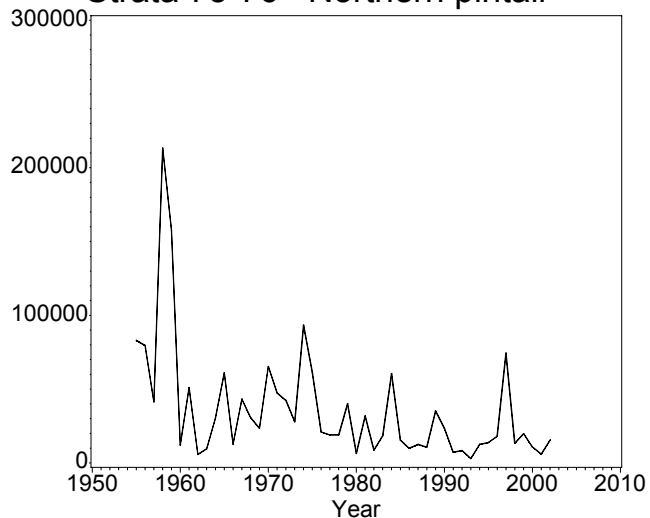
Strata 75-76 Blue-winged teal



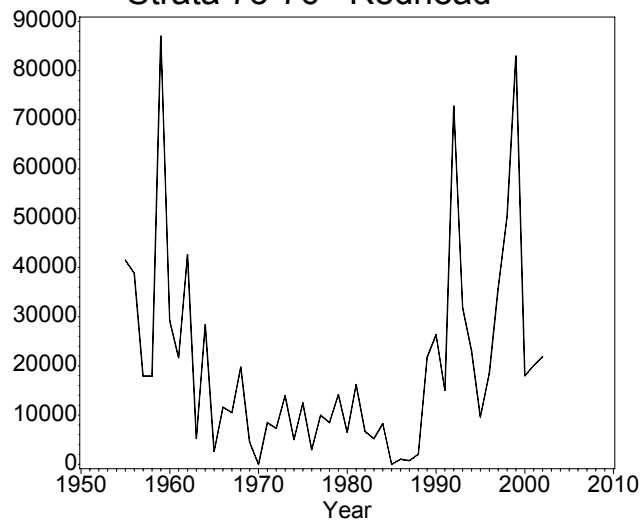
Strata 75-76 Northern shoveler



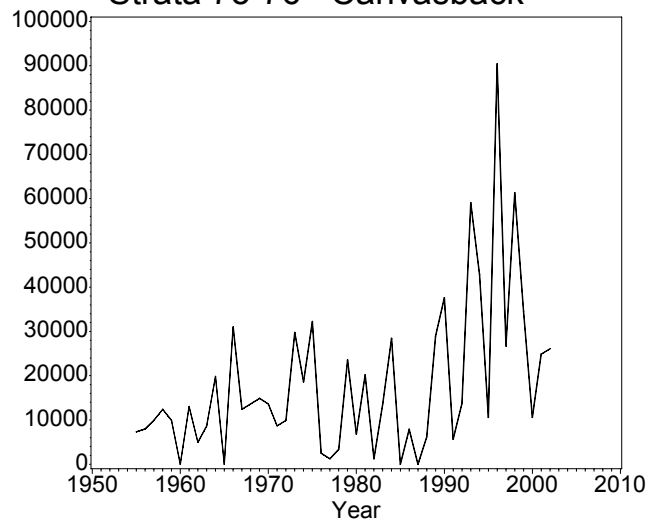
Strata 75-76 Northern pintail



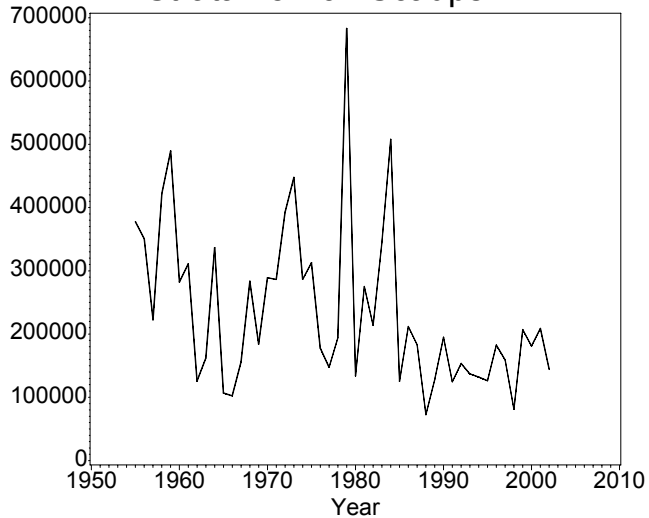
Strata 75-76 Redhead



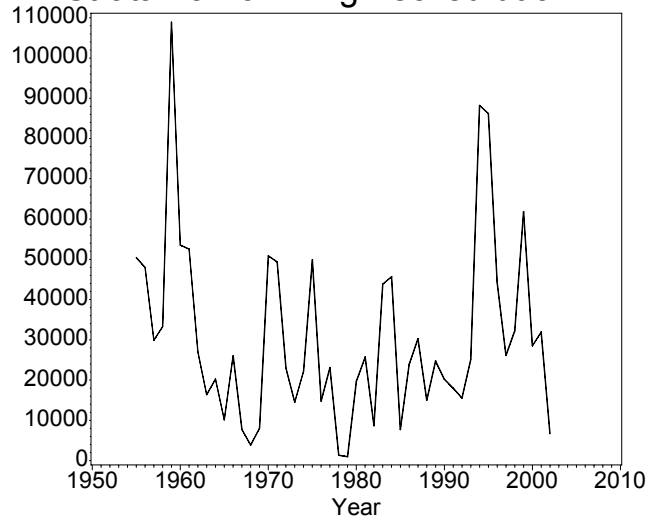
Strata 75-76 Canvasback



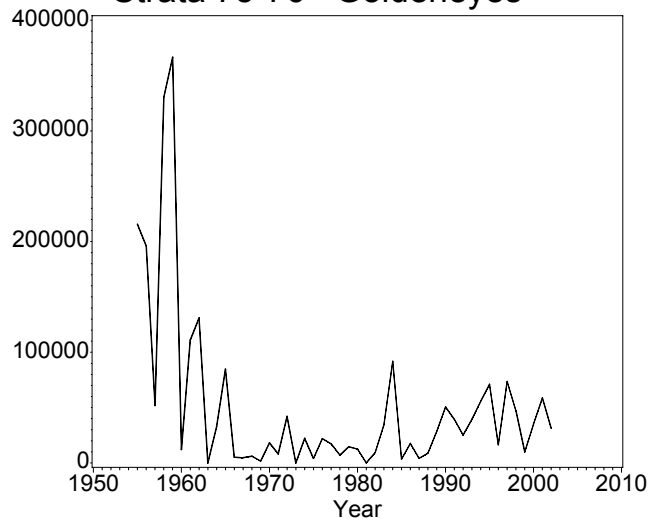
Strata 75-76 Scaups



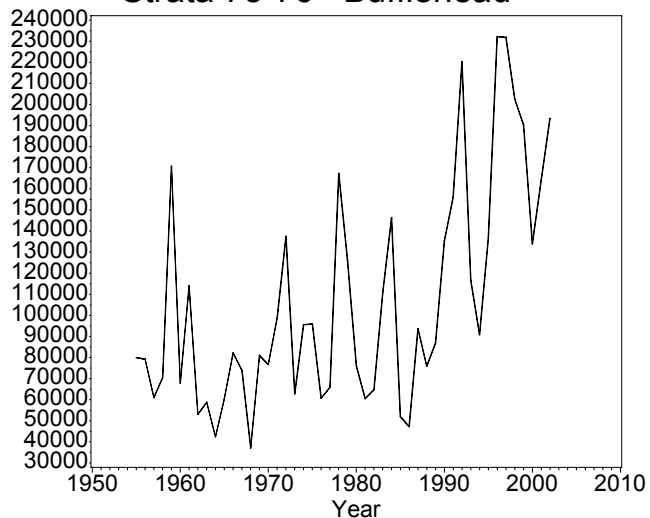
Strata 75-76 Ring-necked duck



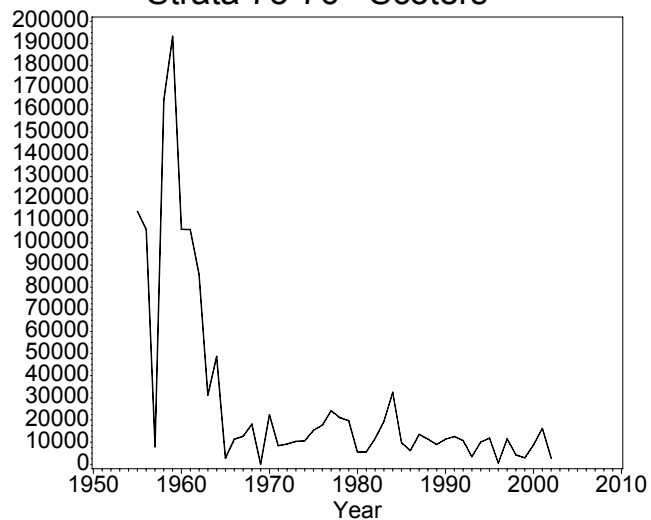
Strata 75-76 Goldeneyes



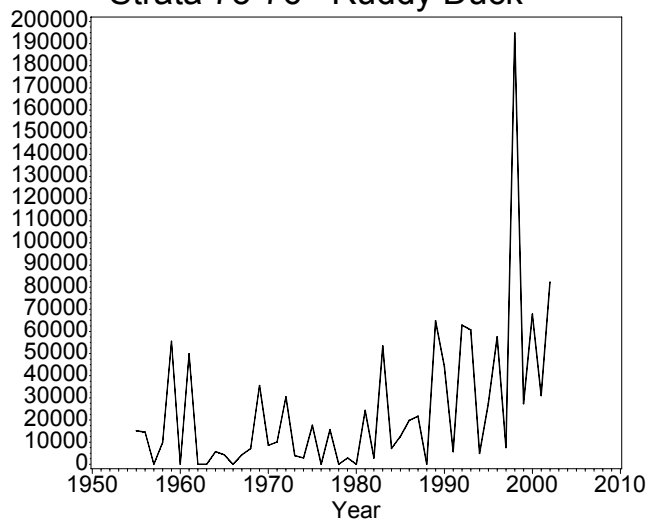
Strata 75-76 Bufflehead



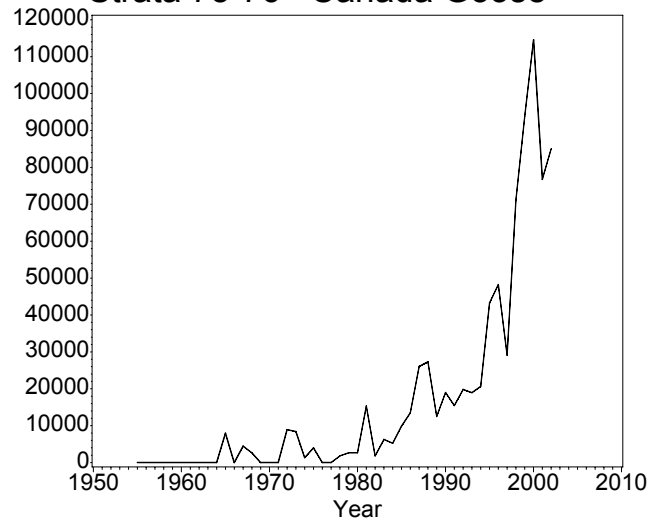
Strata 75-76 Scoters



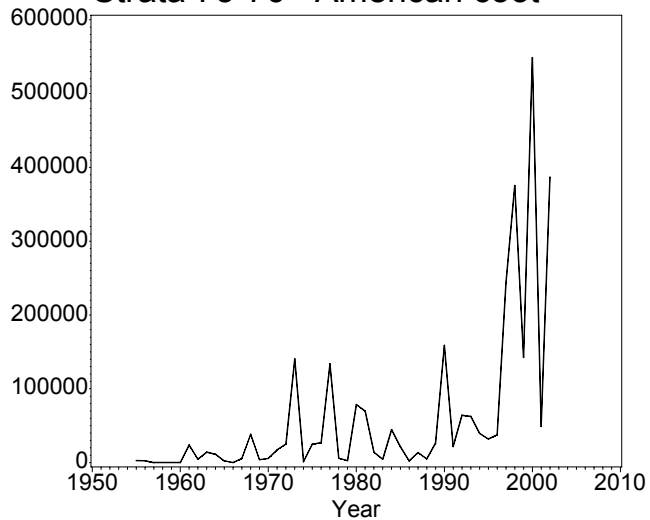
Strata 75-76 Ruddy Duck



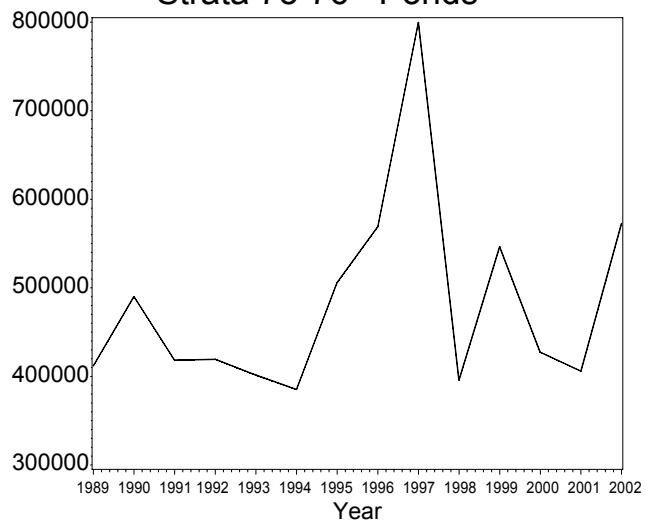
Strata 75-76 Canada Goose



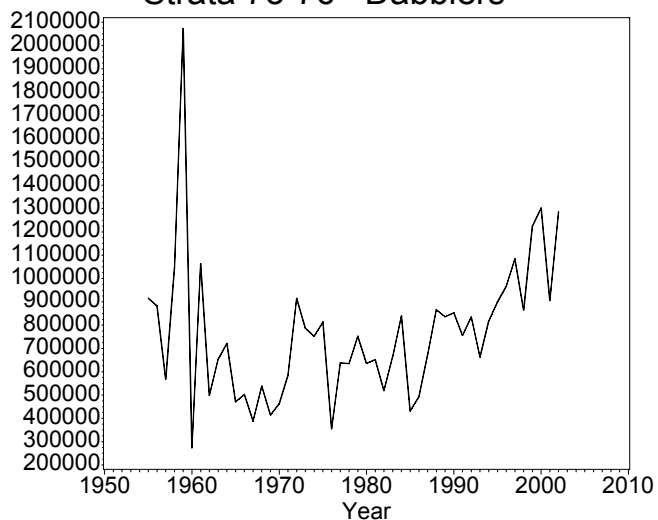
Strata 75-76 American coot



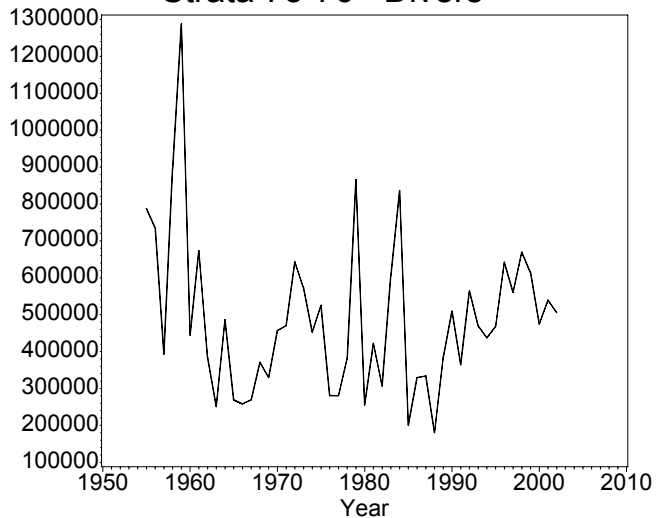
Strata 75-76 Ponds



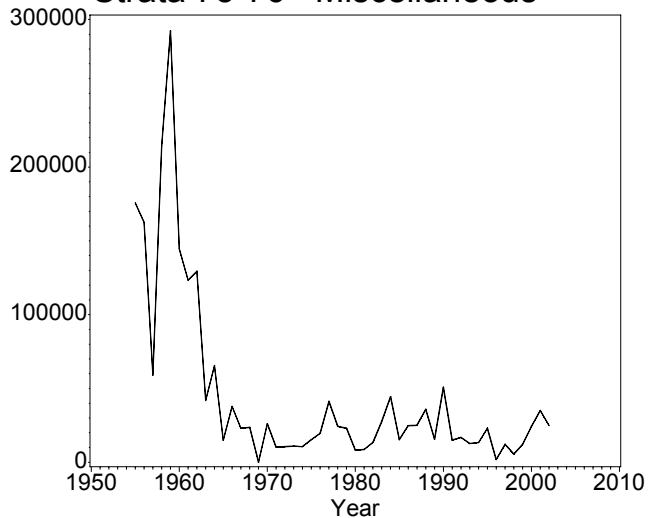
Strata 75-76 Dabblers



Strata 75-76 Divers



Strata 75-76 Miscellaneous



Strata 75-76 Total Ducks

